RUNNING HEAD: SUICIDAL IDEATION AND SUICIDE ATTEMPTS

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Word Count: 6981

Suicide Attempts and Suicidal Ideation in a Birth Cohort of 16 Year Old New Zealanders

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This research was funded by grants from the Health Research Council of New Zealand and the National Child Health Research Foundation.

ABSTRACT

Objective: The aims of this study were to: a) describe the prevalence of suicide attempts and suicidal ideation in a birth cohort of New Zealand children studied to the age of 16 years; b) examine the extent to which risks of suicide attempts and suicidal ideation varied with levels of adolescent psychopathology, problems of adjustment and exposure to adverse conditions during childhood; c) examine the extent to which those attempting suicide could be distinguished from those reporting suicidal ideation alone.

Method: Data were gathered on suicide attempts, suicidal ideation, psychiatric diagnoses, adjustment problems and childhood factors during the course of a 16 year longitudinal study of a birth cohort of New Zealand children.

Results: 12% of this cohort reported suicidal ideation before the age of 16 years and 3% attempted suicide. The extent to which young people expressed suicidal tendencies varied with: a) the extent to which the young person met criteria for psychiatric disorder; b) the extent of adjustment problems and c) the extent to which the young person had been exposed to adverse family circumstances. Those attempting suicide were distinguished from those reporting suicidal ideation by having significantly higher rates of psychopathology ($p<.05$), higher

rates of adjustment problems ($p<.005$) and greater exposure to childhood and family adversity ($p<.05$).

Conclusion: The results of this analysis were consistent with a dimensional model of suicidal behaviors in which those attempting suicide are distinguished from those reporting suicidal ideation alone by having a greater burden of psychosocial risk factors including psychiatric disorder, adjustment problems and adverse childhood circumstances.

Keywords: Suicide attempts, suicidal ideation, psychiatric disorder, adjustment problems, family factors.

In recent years there have been increasing concerns and research into suicidal behaviors amongst adolescents and young adults (for reviews of this literature see Diekstra, 1989; Pfeffer, 1989; Ryland & Kruesi, 1992; Shaffer, 1988; Spirito et al., 1989). These concerns have been motivated by international evidence that has suggested rising rates of suicide in youthful populations in many countries including the USA, Great Britain and Australasia (Diekstra, 1989). One issue raised by this research has concerned the relationships that exist between suicidal thoughts or ideation and suicidal behaviors. The available evidence suggests that while many young people contemplate suicide at some time in their lives (Centres for Disease Control, 1991; Dubow et al., 1989; Garnefski et al., 1992; Garrison et al., 1991, Goldney et al., 1989; Joffe et al., 1988; Rudd, 1988; Smith & Crawford, 1986; Swanson et al., 1992), far fewer make suicide attempts and, of those making suicide attempts, the majority of attempts are non fatal (Andrews & Lewinsohn, 1992; Centres for Disease Control, 1991; Dubow et al., 1989; Felts et al., Garnefski et al., 1992; Goldney et al., 1989; Joffe et al., 1988; Meehan et al., 1992; Rudd, 1988; Smith & Crawford, 1986).

An important issue raised by these findings concerns the differences between young people who attempt suicide and those who report suicidal ideation but do not make suicide attempts. A number of authors have suggested that suicidal behaviors may

be conceptualized as a continuum ranging from suicidal ideation to suicide attempts (Dubow et al., 1989; Pfeffer et al., 1979). This approach implies that those making suicide attempts should differ from those reporting suicidal ideation but not making suicide attempts and one might expect to find that those making attempts were characterized by higher exposure to the known risk factors for youthful suicide attempts (psychiatric disorder, problems of adjustment, psychosocial adversity, etc).

The evidence on the extent to which those making suicide attempts differ from those reporting suicidal ideation has been somewhat contradictory. In a recent study Kosky et al (1990) examined the differences between those making suicide attempts and those reporting suicidal ideation in a sample of clinic referred adolescents. Their analysis showed few differences in the levels of problems or psychopathology amongst those making attempts and those reporting suicidal ideation. These findings led the authors to conclude "children who attempt suicide and children with suicidal ideation are part of the same at-risk population." (Kosky et al., 1990, p 41). In contrast, a study by Dubow et al (1989) examined the differences between suicide attempters and those reporting suicidal ideation in a sample of US high school students. That study found that those attempting suicide had higher rates of negative life events, lower levels of family support and higher rates of adjustment problems than those

reporting suicidal ideation. Dubow et al's (1989) results tend to suggest that those attempting suicide were distinguished from those reporting suicidal ideation by having a greater burden of psychosocial risk factors.

The differences between the conclusions drawn by Kosky et al (1990) and Dubow et al (1989) may reflect the different sampling bases of the two studies. In particular, Kosky et al (1990) studied a sample of clinic referred adolescents and it may be that the differences between those expressing suicidal ideation and those attempting suicide were obscured in this study as a result of the use of a sample in which subjects were preselected for high levels of symptomatology or suicide risk.

While the issue of the differences between those who consider suicide without making an attempt and those who make an attempt is of theoretical interest, the answer to this question may also be of practical importance to the extent that, if the factors which distinguish attempters from those with ideation only can be identified, it may be possible to form estimates of the risk that a young person expressing suicidal ideation has of attempting suicide given other characteristics of that individual.

In this paper we address the issues raised above by reporting on a study of suicidal ideation and attempted

suicide in a birth cohort of New Zealand children studied up to the age of 16 years. The aims of this research were to address a series of questions concerning suicidal ideation and suicide attempts in young people. These questions included:

1. What was the prevalence of suicidal ideation and attempted suicide in the cohort under study?

2. To what extent were those having suicidal ideation or making suicide attempts different from other adolescents in terms of their patterns of psychopathology, individual adjustment and family background?

3. To what extent could those making suicide attempts be distinguished from those reporting suicidal ideation but not making an attempt in terms of measures of psychopathology, personal adjustment and family background?

Method

The data reported here were collected during the course of the Christchurch Health and Development Study. The Christchurch Health and Development Study is a longitudinal study of a birth cohort of 1265 children born in the Christchurch urban region during mid 1977. These children have been studied at birth, four months, one year and annual intervals to the age of 16 years using a variety of techniques including parental interview, teacher questionnaires, self report and official sources of information including hospital and police records. An overview of the study design has been

given previously (Fergusson et al., 1989). The data analyzed in this report were as follows:

1. Suicidal ideation and attempted suicide. At ages 15 and 16 years the young people were asked, as part of an interview concerning their mental health, whether they had thought about taking their lives by suicide. If they reported suicidal ideation they were then asked a further series of questions concerning the nature of these thoughts, their frequency and any reasons for these thoughts. Additionally, all subjects were asked whether they had attempted to commit suicide. If the subject reported having made a suicide attempt he/she was asked a series of further questions concerning the nature and consequences of their suicide attempt. A detailed description of the prevalence and nature of suicide attempts in this cohort has been provided previously (Fergusson & Lynskey, in press). That analysis showed that by the age of 16 years, 3% of cohort members had attempted suicide (no cohort member had died as a result of suicide). The majority of suicide attempts did not require medical intervention but in 6 cases (0.6%) young people were admitted to hospital as a result of wrist cutting or overdose.

2. Measures of psychiatric disorder(s). At ages 15 and 16 years, sample members were assessed using both parent and self report data on a series of measures including the Revised Behavior Problem Checklist (Quay & Peterson, 1986), the

Diagnostic Interview Schedule for Children (Costello et al., 1982) and the Self Report Early Delinquency Scale (Moffitt & Silva, 1988). All interviews were conducted by trained lay interviewers. From these sources, DSM-III diagnoses of common adolescent disorders were constructed for both parent and self report. The methods used in this classification have been described previously (Fergusson et al., 1993). To estimate the cumulative prevalence of disorders over the period from 14 to 16 years, parent and self reports were combined for each diagnostic grouping to produce an estimate of whether or not the subject met DSM-III-R criteria for the disorder at any time between the ages of 14 to 16 years on the basis of self or parentally reported symptoms. The reason for classifying subjects on the basis of self or parent report was that a previous analysis using latent class methods suggested that classification on the basis of parental or self report led to optimal classification accuracy (Fergusson et al., 1993). At the same time, it is likely that this method may lead to an overestimation of cumulative prevalence as a result of false negative or false positive reports from one or both sources of reporting. The diagnostic groupings to which this method of classification was applied were:

i) Mood disorders including major depression and dysthymia.

ii) Anxiety disorders including generalised anxiety, separation anxiety, over anxious disorder and social phobia.

iii) Disruptive behavior disorders including conduct

disorder and oppositional defiant disorder.

iv) Substance use disorders including nicotine dependence, alcohol abuse and illicit drug use.

3. Problems of adolescent social adjustment. To assess the extent to which the young people were subject to problems of personal adjustment other than psychiatric disorder the following measures were used:

i) Self-report young offending. This measure was based on responses to the Self-Report Early Delinquency Scale (SRED; Moffitt & Silva, 1988) at ages 15 and 16 years. A cut off of five or more offences during the two year period was used to define a category of recurrent offending.

ii) Police contact. Parental and self reports of whether or not the young person had come to official police attention for offending at ages 15 and 16 years were combined to form a measure of whether or not the young person had been in police contact during the two year period.

iii) High school dropout. To measure school dropout rates those who ceased formal education before the age of 16 years were classified as school dropouts.

iv) Self esteem. At age 15 years self-esteem was measured using the Coopersmith Self Esteem Inventory (SEI, Coopersmith, 1981). To provide a measure of low self esteem

young people who scored in the lowest 10% of the total SEI distribution were classified as having low self-esteem.

iv) Classification as a multiple problem teenager. In a previous paper (Fergusson et al., 1994) we applied methods of latent class analysis to data on five measures of adolescent problem behaviors (early onset sexual activity, cannabis use, alcohol abuse, conduct/oppositional disorders and official police contact). This analysis identified a small proportion of young people (2.7% of the sample) who were characterized by multiple problem behaviors. From the fitted latent class model it was possible to identify the members of this latent class.

4. Measures of childhood difficulties. To assess the extent to which the young people were subject to adverse childhood and family circumstances the following measures were included in the analyses:

a) Family social background.

i) Socio-economic status. Family socioeconomic status at the time of the child's birth was measured using the Elley and Irving (1976) scale of socioeconomic status for New Zealand.

ii) Average family income. Each year measures of gross family income were obtained from parental report. To provide estimates of the average level of family income over the

period 0-5 years the annual income figures were recoded into deciles and the decile rankings were then averaged to produce an average decile rank for the family.

b) Parental characteristics.

i) Family history of alcohol/drug abuse. When sample members were aged 15 years their mothers were questioned about problems of alcohol/substance use in themselves, their spouse and the child's siblings. A young person was classified as having a family history of alcohol/drug problems if either one of his/her parents or a sibling were reported as having a history of alcohol/drug problems.

ii) Family history of offending. When sample members were aged 15 years their mothers were questioned about criminal offending by themselves, their spouse and the child's siblings. A young person was classified as having a family history of offending if either one of his/ her parents or a sibling were reported as having a history of offending.

c) Childhood experiences.

i) Maternal emotional responsiveness. Early mother-child interaction was assessed at age three years using the maternal emotional responsiveness subscale of the HOME inventory (Bradley & Caldwell, 1977; Elardo et al., 1977).

ii) Childhood experiences (8-10 years). This was based on a count of the number of experiences (eg., going on a plane, going camping) the child had encountered over the

period from 8-10 years, based on an expanded version of the experiences scale described by Silva and Fergusson (1977).

d) Marital stability.

i) Changes of parents. This measure was based on the total number of changes of parent figures experienced by the child as a result of parental separation, reconciliation, remarriage or other family transitions during the period from 0-15 years.

ii) Parental conflict. This measure was based upon the frequency of parental arguments, assault by husband and problems with sex as reported by the mother at each year (Fergusson et al., 1992).

e) Childhood stability.

i) Changes of residence. The number of changes of residence experienced by the child during the period from 5-15 years.

ii) Changes of school. The number of changes of school experienced by the child up to the age of 15 years.

For the purposes of analysis each of the childhood and family variables above was dichotomized to create a series of binary measures of childhood disadvantage. The following rules were used for dichotomizing the variables; (i) for continuous measures dichotomies were formed by classifying sample members whose scores placed them in the least

advantaged 10% of the sample as being disadvantaged. Where a 10% cutpoint was not feasible the next closest cutpoint above 10% on the distribution was chosen. (ii) For other variables "natural" cutting points were defined on the distribution. Table 3 shows the cutpoints used for these variables.

Sample Size

While the study reported here was based on a birth cohort of 1265 children, the analyses reported here were based on a sample of 954 adolescents. This sample represents 75.4% of the initial cohort of children and 85.9% of the sample alive and resident in New Zealand at the age of 16 years. To examine the effects of sample losses on the representativeness of the sample, comparisons were made of the socio-demographic characteristics of the 954 subjects included in the analysis with the remaining 311 subjects excluded from the analyses. This suggested that losses to follow up during the course of the study were not associated with child ethnicity, gender, maternal age or family size. There were, however, small but statistically detectable tendencies ($p<.01$) for the sample to under-represent children from families in which mothers lacked formal educational qualifications, families of low socio-economic status and single parent families.

While these results suggest some small non-random loss of subjects, it is unlikely that these losses will materially influence the results in this study (Fergusson et al., 1991).

Results

1. The prevalence of suicide attempts and suicidal ideation.

By the age of 16 years 143 (15.0%) of the cohort members studied reported experiencing either suicidal ideation or making a suicide attempt. Of this number 114 reported suicide ideation only and 29 reported making a suicide attempt. (All subjects reporting a suicide attempt had reported suicidal ideation in questions asked prior to the questions on attempts.) As we have described in a previous paper (Fergusson & Lynskey, in press) most suicide attempts did not require medical intervention but nonetheless six young people were admitted to hospital as a consequence of attempted suicide. Five of these admissions were for overdose and one for wrist cutting behaviors.

2. The relationships between the extent of suicidal ideation or behaviors and mental health.

Table 1 shows the sample classified into three groups: a) young people who reported neither suicide attempts nor suicidal ideation (N = 811; b) young people who reported suicidal ideation but who had not made a suicide attempt (N = 114) and c) young people who had made a suicide attempt (N = 29). For each group the Table shows estimates of the prevalence of various psychiatric disorders during the period

from 14 to 16 years. Each comparison in the Table is examined using the following statistical tests. First, to examine the extent to which risks of disorder varied with the extent of suicidal thoughts/behaviors, the Mantel-Haenszel test of linearity is used. This test assesses the extent to which there was a linear trend between the subjects extent of suicidal behavior and risks of psychiatric disorder. The Table also reports on chi-square tests of the extent to which rates of disorder were similar for those reporting suicidal ideation and those making suicide attempts.

The results in Table 1 produce a very clear and generally highly consistent set of results. Firstly, there was consistent evidence for all diagnoses that the risks of disorder increased significantly ($p<.001$) with the extent of suicidal thoughts/behavior displayed by the subjects: Those reporting neither suicidal ideation nor behaviors had the lowest rate of disorder whereas those making suicide attempts had the highest rates of disorder. Further, with the exception of anxiety disorders, those making suicide attempts had significantly higher rates of disorder than those reporting suicidal ideation only ($p<.05$). The results in Table 1 are clearly consistent with a dimensional model in which the risks of suicidal behavior varied with the extent of mental health problems displayed by the young person.

INSERT TABLE 1. HERE

2. The relationship between measures of personal adjustment and the extent of suicidal tendencies.

Table 2 shows a parallel analysis in which the extent of suicidal thoughts/behavior was related to rates of personal adjustment problems including juvenile offending, police contact, school dropout, classification as a multiple problem teenager and low self-esteem. The results in Table 2 closely parallel the results in Table 1 and show that with increasing suicidal tendencies there were parallel increases in the rates of police contact, school dropout, juvenile offending, classification as a multiple problem teenager and low self esteem: In all comparisons those who reported no suicidal behavior or ideation had the lowest rates of adjustment problems whereas those who reported having made a suicide attempt had the highest rates of adjustment problems. The Mantel-Haenszel test for linear trend shows that in all cases there were significant linear trends ($p<.001$) between the extent of suicidal tendencies and the probability of experiencing problems of personal adjustment. Further, for five of the six comparisons the rates of personal problems were significantly ($p<.05$) higher amongst suicide attempters than amongst those reporting suicidal ideation alone and there was a marginally significant ($p = .06$) tendency for rates of low self-esteem to be higher amongst those who attempted suicide than amongst those who reported suicide ideation without making a suicide attempt.

INSERT TABLE 2. HERE

3. The relationship between childhood and family background and the extent of suicidal tendencies.

Table 3 reports on the relationships between suicidal tendencies and a series of measures of childhood and family background. This Table shows that the extent of family difficulties, disadvantage or adversity varied with the extent of suicidal behaviors. In nine of the ten comparisons there were significant ($p<.05$) linear trends between the extent of suicidal tendencies and levels of family adversity. However, the contrasts between those reporting suicidal ideation and those making suicide attempts showed that there were no detectable ($p>.05$) differences between those making attempts and those reporting ideation. The Table does, however, show that in all cases those reporting attempts had higher levels of childhood and family adversity than those reporting ideation only suggesting that those making an attempt had generally come from families facing greater adversity. This issue is examined in the last entry in Table 3 which shows the mean number of adversities experienced by each group. This analysis shows that while those attempting suicide did not report significantly higher rates of specific childhood or family adversities, they were characterized by a higher overall rate of childhood or family adversity ($p<.05$).

INSERT TABLE 3. HERE

4. The net effects of adolescent psychopathology, adolescent problems and family circumstances on risks of attempted suicide amongst those reporting suicidal ideation.

The results thus far suggest that those who attempted suicide were distinguished from those with suicidal ideation alone by having higher rates of adolescent psychopathology, higher rates of adolescent problems of adjustment and greater exposure to childhood adversity. These results are generally consistent with a dimensional model of suicidal behaviors and suggest that those making suicide attempts were a higher risk group than those reporting suicidal ideation alone. At the same time, it is clear that factors such as adolescent psychopathology, adolescent problems of adjustment and childhood or family adversities are likely to be inter-correlated. To examine the net effects of these factors on risks of suicide attempts, a logistic model was fitted to the data. The model fitted was:

$$\text{Logit } Pr(Y = 1) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3$$

where Logit Pr(Y = 1) was the log odds that a young person reporting suicidal ideation would be a suicide attempter; X_1 was a count of the number of psychiatric diagnoses for that individual, X_2 a count of the number of

adolescent problems of adjustment that were reported and X_3 a count of the number of childhood or family adversities reported. The results of this analysis are summarized in Table 4 which shows the adjusted probabilities of attempted suicide (among those reporting suicidal ideation) for each level of the three explanatory factors (number of psychiatric diagnoses, number of adolescent problems of adjustment, number of childhood or family adversities). The adjusted rates may be interpreted as the hypothetical probability of suicide attempts for each level of each factor when the inter-correlations between the factors have been taken into account. This analysis showed:

1. The presence of a significant ($p<.05$) association between the number of psychiatric disorders and risks of suicide attempts. Individuals who met DSM-III-R criteria for three or more disorders had adjusted rates of attempted suicide that were 3.0 times higher than for those who did not meet diagnostic criteria for any disorder.

2. The presence of a significant ($p<.05$) association between the number of adolescent problems of adjustment that were reported and risks of suicide attempts. Individuals who reported three or more adjustment problems had adjusted rates of suicide attempts that were 2.4 times higher than those who reported no adjustment problems.

3. The presence of a marginally significant ($p<.10$) association between the number of childhood and family adversities and rates of suicide attempts. Those experiencing

four or more childhood adversities had adjusted rates of attempted suicide that were 1.9 times higher than those who experienced no childhood adversities.

INSERT TABLE 4. HERE

In general, the results in Table 4 suggest that the risks that an individual who expressed suicidal ideation had of attempting suicide varied with the extent that he/she had psychiatric disorders; was reported as having adolescent problems of adjustment or had been exposed to childhood or family adversity. To examine the overall impact of disorders, adolescent problems of adjustment and adverse childhood circumstances on risks of attempted suicide, an overall risk index was constructed. From the parameters of the logistic regression model it was possible to estimate, for each subject, his/her risk of attempted suicide given the presence of suicidal ideation and other risk factors.

Table 5 shows the resulting risk score divided into five approximately equal sized groups of subjects ranging from those with low risks of attempted suicide to those with high risks. To describe each group, the Table also shows the profile of mean disorder, adjustment and family problem scores. These profiles show that the exposure to risk from these factors ranged from the very low for group 1 who reported means of less than .60 on all three measures to very

high for group 5 who, on average, reported mean disorder scores, adjustment problems and family problem scores in the region of 2.80 to 3.70. For each group defined the Table shows the number of subjects in the group and the percentage of this number who made a suicide attempt.

The Table shows the presence of a relatively strong dose/response relationship between the extent of exposure to risk factors for suicide attempts and risks of suicide attempt. Amongst those with the lowest risk score (low rates of family problems, adjustment problems and psychiatric disorder) none had attempted suicide whereas amongst those with the highest risk scores (multiple disorders, adjustment problems and family problems) 40% had made a suicide attempt. These findings suggest that amongst those reporting suicide ideation risks of suicide attempts varied quite widely depending on the individual's level of exposure to psychiatric disorder, adjustment and family problems.

INSERT TABLE 5. HERE

Discussion

In this paper we have examined series of issues relating to suicidal ideation and suicide attempts in a birth cohort of New Zealand children studied to the age of 16 years. The

major findings of this study and their implications are discussed below.

1. The prevalence of suicidal ideation and suicide attempts.

The results of this study confirm the findings of previous research that has suggested that a sizeable minority of young people either experience suicidal ideation or make suicide attempts. In this study, 12% of young people admitted to considering suicide before the age of 16 years and a further 3% reported making a suicide attempt. Since it seems likely that a number of young people would have chosen to conceal suicidal thoughts or actions, these figures are likely to give a lower limit estimate of the prevalence of suicidal ideation and attempts within this cohort. The prevalence of suicide attempts for this cohort (3%) falls within the range of estimates reported in previous studies which have suggested that between 2% to 10% of young people make such attempts (Andrews & Lewinsohn, 1992; Centres for Disease Control, 1991; Dubow et al., 1989; Felts et al., 1992; Garnefski et al., 1992; Goldney et al., 1989; Joffe et al., 1988; Meehan et al., 1992; Smith & Crawford, 1986). Estimates of the prevalence of suicidal ideation in young people have varied widely from as low as 6% (Garrison et al., 1991) to as high as 63% (Smith & Crawford, 1986) with most studies reporting a prevalence in the region of 20% to 25% (Andrews & Lewinsohn, 1992; Centres for Disease Control, 1991; Goldney et al., 1989; Swanson et

al., 1992). The prevalence of suicidal ideation for this cohort (15%) appears to be slightly lower than reported in most studies.

2. Do those reporting suicidal ideation differ from those making suicide attempts?

The findings of this study clearly support the conclusion that those attempting suicide and those reporting suicidal ideation but not making an attempt are distinct populations with those attempting suicide being characterized by a greater burden of psychosocial risk factors for suicide including higher rates of psychiatric disorder, higher rates of problems of adjustment and greater exposure to childhood and family adversity. These conclusions are generally consistent with the findings of Dubow et al (1989) in their study of suicide attempts and suicidal ideation in a high school population to the extent that both studies suggest that adolescents making suicide attempts are distinguished from those reporting ideation by higher exposure to known risk factors for adolescent suicidal behaviors. These conclusions are consistent with a dimensional model which assumes that suicidal behaviors range along a continuum from none to severe with the extent of suicidal tendencies expressed by the individual varying with the extent of exposure to risk factors for suicidal behaviors.

Our findings are, however, not consistent with the results reported by Kosky et al (1990) who concluded that those making suicide attempts and those reporting suicidal ideation form a common at risk population. Specifically, in contrast to the present study, Kosky et al (1990) found that those attempting suicide did not have any greater rates of psychopathology and other problems than those reporting suicidal ideation alone. As we have commented earlier, this difference may have arisen because Kosky et al's (1990) study was confined to a clinic sample and it is likely that the generally high level of psychopathology present in this sample may have obscured differences between those making suicide attempts and those reporting suicidal ideation. Consideration of the evidence tends to suggest that, while it is possible to distinguish between suicide attempters and those reporting suicidal ideation in general population samples, this discrimination may not be possible in clinic referred samples in which members are preselected for having high levels of psychiatric symptoms and other risk factors associated with suicide attempts.

3. Is it possible to predict those at risk of suicide attempts amongst those reporting suicidal ideation?

Since there were detectable differences between those expressing suicidal ideation only and those making suicide attempts, some prediction of the risk of suicide attempt was

possible. Specifically the analysis suggested that amongst those expressing suicidal ideation but with low levels of exposure to psychiatric disorder, adjustment or family problems, risks of suicide attempt were low and in this cohort no individual with a low score on these factors made a suicide attempt. However, as the burden of psychosocial factors faced by the individual increased there was a clear increase in suicide risk so that 40% of those with high levels of exposure to psychiatric disorders, adjustment and family problems had made suicide attempts. These results clearly suggest that suicidal ideation in the absence of other risk factors is not, typically, associated with an increased rate of suicide attempt whereas suicidal ideation in combination with multiple psychiatric disorders, adjustment problems and family problems is associated with a substantial risk of suicide attempt.

Whilst some discrimination of risks of suicide attempt was possible on the basis of psychological factors, it must be stressed that within this population this prediction was only moderate and all groups of adolescents studied were more likely not to attempt suicide than to attempt suicide. Thus the risk gradient that was found in this study was not sufficiently marked for accurate prediction of individual suicide attempts to be made, even though it was possible to distinguish between subjects having low risks of suicide attempts and subjects having risks of suicide attempts of up to 40%.

Furthermore, the level of prediction of suicide risk found in this study is likely to be substantially better than the prediction present for clinically referred populations. This is because clinic populations are samples that are selected on the basis of the very factors that predict suicide risk (psychiatric disorder, adjustment problems and family problems). The means that within clinical populations, individuals will tend to be relatively homogeneous with respect to these factors and the lack of variation in the predictors of suicide attempt risk will seriously compromise efforts to predict suicide attempt risk. As we have commented earlier the limited variability of risk factors within clinical populations appears to be the reason why studies of general population samples (eg., Dubow et al., 1989) have reported some prediction of suicide attempt risk in adolescence is possible whereas clinic based studies (Kosky et al., 1993) have failed to find differences between those expressing suicidal ideation and those attempting suicide.

Given this conclusion it seems highly unlikely that accurate prediction of suicide risk within clinical populations will be possible (unless some set of factors is identified that prove to be strongly discriminating of this risk but are largely independent of the risk factors found in this study).

At the same time the present findings may be of some use to practicing clinicians in assessing young people referred for suicidal ideation. In particular this study suggests that suicidal ideation in the absence of other risk factors is rarely associated with suicide attempts. However, the high risk teenager is characterized by suicidal ideation in combination with multiple disorders, multiple adjustment problems and multiple family problems. Our results suggest that by the age of 16 years in the region of 40% of young people with this profile will have made a suicide attempt and it is likely that longer term study of this cohort will reveal that the lifetime prevalence of suicide attempts amongst those with this profile is very high.

Given the likely difficulties of predicting suicide risk within clinical populations and the identification of a subgroup of the population who are likely to be at high lifetime risks of suicidal behaviors, it seems likely that the best approach to suicide prevention in adolescence is not through what are likely to be quixotic attempts to predict those patients who will attempt suicide but rather through improved primary, secondary and tertiary interventions that reduce the number of young people in the population who present with a profile of suicidal ideation in combination with multiple disorders, multiple adjustment problems and multiple family problems. This conclusion is generally consistent with that drawn by Garland and Zigler (1993) in

their analysis of adolescent suicide prevention methods in which they suggest the major emphasis in the reduction of adolescent suicide risk should be in the area of minimizing exposure to known risk factors for adolescent mental health problems and with better treatment and recognition of adolescent psychiatric disorders.

References

American Psychiatric Association (1987), Diagnostic and Statistical Manual of Mental Disorders, 3rd edition-revised (DSM-III-R). Washington, DC: American Psychiatric Association.

Andrews JA, Lewinsohn PM (1992), Suicidal attempts among older adolescents: prevalence and co-occurrence with psychiatric disorders. J Am Acad Child Adolesc Psychiatry 31:655-662

Bradley RM, Caldwell BM (1977), Home observation for measurement of the environment: a validation study of screening efficency. American Journal of Mental Deficiency 81:417-424

Centres for Disease Control (1991), Attempted suicide among high school students - United States, 1990. JAMA 266: 1911-1912

Coopersmith S (1981), SEI - Self-esteem inventories. Palo Alto, CA: Consulting Psychologists Press.

Costello A, Edelbrock C, Kalas R, Kessler M, Klaric SA (1982), Diagnostic Interview Schedule for Children (DISC), Bethesda, MD: National Institute of Mental Health.

Diekstra RFW (1989), Suicidal behavior in adolescents and young adults: The international picture. Crisis 10:16-35

Dubow EF, Kausch DF, Blum MC, Reed J, Bush E (1989), Correlates of suicidal ideation and attempts in a community sample of junior high and high school students. J Clin Child Psychology 18:158-166

Elardo R, Bradley RM, Caldwell BM (1977), A longitudinal study of the relation of infant home environments to language development at age three. Child Dev 48:595-603.

Elley WB, Irving JC (1976), Revised socio-economic status for New Zealand. New Zealand Journal of Educational Studies 11:25-36

Felts WM, Chenier T, Barnes R (1992), Drug use and suicide ideation and behavior among North Carolina public school students. Am J Public Health 82:870-872

Fergusson DM, Horwood LJ, Lloyd M (1991), Confirmatory factor models of attention deficit and conduct disorder. J Child Psychol Psychiatry 32:257-274

Fergusson DM, Horwood LJ, Lynskey MT (1992), Family change, parental discord and early offending. J Child Psychol Psychiatry 33:1059-1075

Fergusson DM, Horwood LJ, Lynskey MT (1993), Prevalence and comorbidity of DSM-III-R diagnoses in a birth cohort of 15 year olds. J Am Acad Child Adolesc Psychiatry 32:1127-1134

Fergusson DM, Horwood LJ, Lynskey MT (1994), The comorbidities of adolescent problems behaviors. J Abnorm Child Psychol 22:339-354

Fergusson DM, Horwood LJ, Shannon FT, Lawton JM (1989), The Christchurch Child Development Study: a review of epidemiological findings. Paediatr Perinat Epidemiol 3:302-325

Fergusson DM, Lynskey MT (In press), Childhood circumstances, adolescent adjustment and suicide attempts in a New Zealand birth cohort. J Am Acad Child Adolesc Psychiatry

Garnefski N, Diekstra RWF, de Heus P (1992), A population-based survey of the characteristics of high school students with and without a history of suicidal behavior. Acta Psychiatr Scand 86:189-196

Garrison CZ, Jackson KL, Addy CL, McKeown RE Waller JL (1991), Suicidal behaviors in young adolescents. Am J Epidemiol 133:1005-1014

Goldney RD, Winefield AH, Tiggemann M, Wienfield HR, Smith S (1989), Suicide ideation in a young adult population, Acta Psychiatr Scand 79: 481-489

Joffe RT, Offord DR Boyle MH (1988), Ontario Child Health Study: Suicidal behavior in youth age 12-16 years. Am J Psychiatry 145:1420-1423

Kosky R, Silburn S, Zubrick SR (1990), Are children and adolescents who have suicidal thoughts different from those who attempt suicide? J Nerv Ment Dis 178: 38-43

Meehan PJ, Lamb JA, Saltzman LE, O'Carroll PW (1992), Attempted suicide among young adults: Progress toward a meaningful estimate of prevalence. Am J Psychiatry 149:41-44

Moffitt TE, Silva PA (1988), Self-reported delinquency: results from an instrument for New Zealand. Australian and New Zealand Journal of Criminology 21:227-240

Pfeffer CR (1989), Suicide among youth: perspectives on risk and prevention. Washington, DC: American Psychiatric Press

Pfeffer CR, Conte HR, Plutchik R, Jerrett I (1979), Suicidal behavior in latency-age children: An empirical study. J Am Acad Child Psychiatry 18: 679-692

Quay HC, Peterson DR (1987), Manual for the Revised Behavior Problem Checklist. Miami: HC Quay, DR Peterson

Rudd MD (1989), The prevalence of suicidal ideation among college students. Suicide Life Threat Behav 19: 173-183

Ryland DH, Kruesi MJP (1992), Suicide among adolescents. International Review of Psychiatry 4:185-195

Shaffer D (1988), The epidemiology of teen suicide: An examination of risk factors. J Clin Psychiatry 49(9 Suppl):36-41.

Silva P, Fergusson DM (1977), Socio-economic status, maternal characteristics, child experience and intelligence in preschool children. New Zealand Journal of Educational Studies 11:180-188

Smith K, Crawford S (1986), Suicidal behavior among "normal" high school students. Suicide Life Threat Behav 16:313-325

Spirito A, Brown L, Overholser J, Fritz G (1989), Attempted suicide in adolescence: a review and critique of the literature. Clinical Psychology Review 9:335-363

Swanson JW, Linskey AO, Quintero-Salinas R, Pumariega AJ, Holzer CE (1992), A binational school survey of

depressive symptoms, drug use and suicide ideation. J Am Acad Child Adolesc Psychiatry 31: 669-678

Table 1. Comparison of rates (%) of psychiatric disorders (14-16 years) in young people who attempted suicide, those who reported suicidal ideation and other teenagerss

Psychiatric Diagnosis	Suicide Attempters	Suicidal Ideation	Other Teenagers	χ^2 (linear trend)	Ideation vs Attempts
Anxiety Disorders	44.8	31.6	11.7	<.001	>.10
Mood disorders	69.0	32.5	8.8	<.001	<.001
Conduct/oppositional disorders	69.0	36.0	11.3	<.001	<.005
Substance use disorders	65.5	29.0	12.1	<.001	<.001
Any disorder	89.7	68.4	30.0	<.001	<.05
N	29	114	811		

Table 2. Comparison of rates (%) of adolescent problems of adjustment in young people who attempted suicide, those who reported suicidal ideation and other teenagerss

Adjustment Problem	Suicide Attempters	Suicidal Ideation	Other Teenagers	χ^2 (linear trend)	Ideation vs Attempts
Juvenile offending	72.4	42.1	21.6	<.001	<.005
Police contact	65.5	22.8	13.8	<.001	<.001
School dropout	31.0	12.3	3.7	<.001	<.05
Multiple problem	20.7	5.3	1.5	<.001	<.01
Low self esteem	41.4	25.4	7.6	<.001	<.10
Any problem of adjustment	93.1	64.0	33.9	<.001	<.005
N	29	114	811		

Table 3. Rates (%) of disadvantageous childhood factors amongst young people who attempted suicide, those who reported suicidal ideation and other teenagerss

Measure	Suicide Attempters	Suicidal Ideation	Other Teenagers	χ^2 (linear trend)	Ideation vs Attempts
Family Social Background					
Family of unskilled or semi-skilled socio-economic status	41.4	31.6	23.1	<.005	>.30
In lowest decile of average family income level	24.1	14.0	9.6	<.01	>.10
Parental Characteristics					
Family history of alcohol/drug abuse	31.0	21.9	16.7	<.05	>.30
Family history of offending	24.1	12.3	8.9	<.01	>.10
Childhood Experiences					
In lowest decile of maternal emotional responsiveness score	27.6	14.2	9.2	<.005	<.10
In lowest decile of child experiences score (8-10 years)	24.1	11.4	10.2	<.10	<.10

Table 3. Continued

Marital Stability					
>3 changes of parents (5-15 years)	13.8	8.8	5.4	<.05	>.40
In highest decile of family conflict score	20.7	17.5	8.8	<.005	>.60
Childhood Stability					
>5 Changes of residence (5-15 years)	17.2	15.8	5.7	<.001	>.80
>4 Changes of school (5-15 years)	37.9	22.8	14.6	<.001	<.10
Mean Number of Childhood Adversities	2.6	1.7	1.1	<.001[1]	<.05[2]

1. Significance test based on F statistic

2. Significance test based on t statistic

Table 4. Adjusted rate of suicide attempts for varying levels of psychiatric disorder, adjustment problems and adverse family background (for subjects expressing suicidal ideation, N = 143)

	Adjusted Rate (%) of Suicide Attempts
Psychiatric Diagnoses	
0	14.4
1	21.8
2	31.4
3+	42.8
P	<.05
Adjustment Problems	
0	16.9
1	23.4
2	31.2
3+	40.1
P	<.05
Adverse Family Background Factors	
0	17.5
1	22.1
2-3	27.4
4+	33.3
P	<.10

Table 5. Risks of suicide attempts for varying levels of risk score for subjects expressing suicidal ideation (N = 143)

	GROUP MEAN PROFILE				
Risk Score	Mean Psychiatric Disorders	Mean Adjustment Problems	Mean Social Disadvantage Score	N	Percentage Attempting Suicide
1 (Low)	0.10	0.13	0.60	30	0.0
2	1.00	0.70	1.00	27	7.4
3	1.25	1.07	1.79	28	17.9
4	2.07	1.64	2.29	28	35.7
5 (High)	3.20	2.80	3.70	30	40.0